Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (original) A process for producing an acetyl anhydride comprising contacting methane and carbon dioxide in an anhydrous environment in the presence of effective amounts of a transition metal catalyst and a reaction promoter, and an acid anhydride compound, and optionally an acid, to produce a product comprising the acetyl anhydride.

2. (original) A process according to claim 1 further comprising:

(b) contacting the product comprising the acetyl anhydride with water.

3. (original) A process according to claim 2 further comprising recovering acetic acid from step (b).

4. (original) A process according to claim 1 further comprising:

(b) contacting the product comprising the acetyl anhydride with an alcohol.

5. (original) A process according to claim 4 further comprising recovering an acetate ester from the product of step (b).

6. (original) A process according to claim 4 further comprising recovering acetic acid from the product of step (b).

7. (original) A process according to claim 1 in which the catalyst is a vanadium-containing catalyst.

8. (original) A process according to claim 7 in which the catalyst is selected from vanadium pentoxide, vanadium trioxide, sodium metavanadate, vanadium-containing heteropolyacid catalysts and vanadyl acetylacetonate.

9. (original) A process according to claim 7 in which the catalyst is vanadyl acetylacetonate.

10. (original) A process according to claim 1 in which the reaction promoter is selected from $K_2S_2O_8$, $K_4P_2O_8$, calcium dioxide, urea-hydrogen peroxide, and m-chloroperbenzoic acid.

11. (original) A process according to claim 10 in which the reaction promoter is $K_2S_2O_8$.

12. (original) A process according to claim 1 in which the acid anhydride compound comprises sulfur trioxide, sulfur dioxide, trifluoroacetic acid anhydride, fluoromethanesulfonic acid anhydride, trifluoromethanesulfonic acid anhydride, fluorosulfonic acid anhydride, methanesulfonic acid anhydride, NO, NO_2, N_2O_5, P_2O_5, SeO_3, As_2O_5, TeO_3, or B_2O_3 or a mixture of two or more of the foregoing.

13. (currently amended) A process according to claim 1 in which the acid anhydride compound [.]comprises trifluoroacetic acid anhydride.

14. (original) A process according to claim 1 in which the acid anhydride compound comprises trifluoromethanesulfonic acid anhydride.

15. (original) A process according to claim 1 in which the acid anhydride compound comprises sulfur trioxide.

16. (original) A process according to claim 1 in which the acid anhydride compound comprises fuming sulfuric acid.

17. (original) A process according to claim 1 in which an acid is present during the contacting.

18. (original) A process according to claim 17 in which the acid comprises trifluoroacetic, methanesulfonic, fluorosulfonic, fluoromethanesulfonic, trifluoromethanesulfonic, sulfuric, fuming sulfuric, sulfurous, nitric, nitrous, phosphoric,

phosphorous, superphosphoric, or boric acid, or a selenium- and tellurium-containing analog of the sulfur-containing acids, or a mixture of two or more of the foregoing.

19. (original) A process according to claim 17 in which the acid comprises fuming sulfuric acid.

20. (original) A process according to claim 17 in which the acid comprises trifluoroacetic acid.

21. (original) A process according to claim 17 in which the acid comprises trifluoromethanesulfonic acid.

22. (original) A process according to claim 1 in which the acetyl anhydride comprises acetyl sulfate.

23. (original) A process according to claim 1 in which the acetyl anhydride comprises acetyl trifluoroacetate.

24. (original) A process according to claim 1 in which the acetyl anhydride comprises acetyl trifluoromethanesulfonate.

25. (original) A process according to claim 1 in which the temperature is from about 10 to about 200 °C.

26. (original) A process according to claim 1 in which the temperature is from about 60 to about 100 °C.

27. (original) A process for producing acetic acid comprising:

(a) contacting methane and carbon dioxide in an anhydrous environment in the presence of effective amounts of a transition metal catalyst and a reaction promoter, and an acid anhydride compound, and optionally an acid, to produce a product comprising an acetyl anhydride; and

(b) contacting the product of step (a) with water.

28. (original) A process according to claim 27, further comprising:

(c) recovering acetic acid from the product of step (b).

29. (original) A process according to claim 27 in which the catalyst is a vanadium-containing catalyst.

30. (original) A process according to claim 29 in which the catalyst is selected from vanadium pentoxide, vanadium trioxide, sodium metavanadate, vanadium-containing heteropolyacid catalysts and vanadyl acetylacetonate.

31. (original) A process according to claim 29 in which the catalyst is vanadyl acetylacetonate.

32. (original) A process according to claim 29 in which the reaction promoter is selected from $K_2S_2O_8$, $K_4P_2O_8$, calcium dioxide, urea-hydrogen peroxide and m-chloroperbenzoic acid.

33. (original) A process according to claim 32 in which the reaction promoter is $K_2S_2O_8$.

34. (original) A process according to claim 27 in which the acid anhydride compound comprises sulfur trioxide, sulfur dioxide, trifluoroacetic acid anhydride, trifluoromethanesulfonic acid anhydride, fluoromethanesulfonic acid anhydride, fluorosulfonic acid anhydride, methanesulfonic acid anhydride, NO, NO_2, N_2O_5, P_2O_5, SeO_3, As_2O_5, TeO_3, or B_2O_3, or a mixture of two or more of the foregoing.

35. (original) A process according to claim 27 in which the acid anhydride compound comprises trifluoroacetic acid anhydride.

36. (original) A process according to claim 27 in which the acid anhydride compound comprises trifluoromethanesulfonic acid anhydride.

37. (original) A process according to claim 27 in which the acid anhydride compound comprises sulfur trioxide.

38. (original) A process according to claim 27 in which the acid anhydride compound comprises fuming sulfuric acid.

39. (original) A process according to claim 27 in which an acid is present during the contacting.

40. (original) A process according to claim 39 in which the acid comprises trifluoroacetic, fluorosulfonic, methanesulfonic, fluoromethanesulfonic, trifluoromethanesulfonic, sulfuric, fuming sulfuric, sulfurous, nitric, nitrous, phosphoric, phosphorous, superphosphoric or boric acid, or a selenium- or tellurium-containing analog of the sulfur-containing acids, or a mixture of two or more of the foregoing.

41. (original) A process according to claim 39 in which the acid comprises fuming sulfuric acid.

42. (original) A process according to claim 39 in which the acid comprises trifluoroacetic acid.

43. (original) A process according to claim 39 in which the acid comprises trifluoromethanesulfonic acid.

44. (original) A process according to claim 27 in which the acetyl anhydride comprises acetyl sulfate.

45. (original) A process according to claim 27 in which the acetyl anhydride comprises acetyl trifluoroacetate.

46. (original) A process according to claim 27 in which the acetyl anhydride comprises acetyl trifluoromethanesulfonate.

47. (original) A process according to claim 27 in which step (a) is conducted at a temperature of from about 10 to about 200 °C.

48. (original) A process according to claim 27 in which the step (a) is conducted at a temperature of from about 60 to about 100 °C.

49. (original) A process according to claim 27 further comprising recovering acetic acid from step (b).

50. (original) A process according to claim 39 in which an acid corresponding to the acid used in step (a) is recovered from step (b), and said acid is recycled to step (a).

51. (original) A process for the production of an acetate ester comprising:

(a) contacting methane and carbon dioxide in an anhydrous environment in the presence of effective amounts of a transition metal catalyst and a reaction promoter, and an acid anhydride compound, and optionally an acid, to produce a product comprising an acetyl anhydride; and

(b) reacting the product of step (a) with an alcohol to produce a product comprising an acetate ester.

52. (original) A process according to claim 51, further comprising

(c) recovering the acetate ester from the product of step (b).

54. (original) A process according to claim 51 in which the product of step (b) further comprises acetic acid, said process further comprising:

(c) recovering acetic acid from the product of step (b).

54. (canceled)